Amended Claims:

This listing of the claims replaces all previous versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A radiometric temperature measurement system that performs with a low-temperature measurement sensitivity noncontacting measurement of a temperature of a target medium, comprising:

a radiation emission collector including a probe element configured for noncontacting collection of radiation emitted by the target medium, the radiation collected by the probe element having an intensity and occupying a range of wavelengths representing the temperature of the target medium; and

a radiation detector receiving a portion of the radiation collected by the probe element, the radiation emission collector directly coupled to the radiation detector to provide to it low loss transmission of the portion of the radiation collected, the radiation detector having a narrowband wavelength selective spectral response characteristic that enables the radiation detector in response to wavelengths of radiation within the range of wavelengths to provide a signal that is indicative of the temperature of the target medium, the low-temperature measurement sensitivity including measuring temperatures less than about 35°C.

2. (Original) The measurement system of claim 1, in which the radiation emission collector further comprises an optical filter tuned to reject wavelengths of radiation not within the range of wavelengths representing the temperature of the target medium.

3. (Original) The measurement system of claim 1, in which the target medium includes a semiconductor wafer.

4. (Original) The measurement system of claim 1, in which the probe element comprises a light guide formed of aluminum oxide crystals.

5. (Original) The measurement system of claim 4, in which the light guide formed of aluminum oxide crystals is of a yttrium aluminum garnet (YAG) type.

6. (Original) The measurement system of claim 4, in which the light guide formed of aluminum oxide crystals is of a yttrium aluminum perovskite (YAP) type.

7. (Original) The measurement system of claim 1, in which the radiation detector comprises a solid-state detector material including gallium aluminum arsenide (GaAlAs).

8. (Original) The measurement system of claim 7, in which the spectral response characteristic is of a bandpass type and has a radiation responsivity that peaks at about 900 nm and diminishes by about three orders of magnitude at 1,000 nm.

9. (Original) The measurement system of claim 1, further comprising a hot/cold mirror positioned between the probe element and the radiation detector, the hot/cold mirror reflecting back to the specimen radiation that is collected by the probe element and is of wavelengths not within the range of wavelengths, the radiation reflected back to the target medium contributing to a maintaining of the temperature of the target medium.

10. (Original) The measurement system of claim 9, in which the reflected radiation propagates through the probe element to the target medium.

11. (Original) The measurement system of claim 1, further comprising an integrating converter that is responsive to the signal provided by the radiation detector, the signal having a signal amplitude that is indicative of the temperature of the target medium, and the integrating converter providing after each of successive integration intervals a sample output signal corresponding to the signal amplitude, the successive integration intervals occurring in a timing sequence in the absence of timing jitter caused by interruption of any one of the successive integration intervals.

12. (Original) The measurement system of claim 11, in which the integrating converter comprises a microprocessor having a synchronous serial port (SSP) that is capable of generating a high-speed clock having high-speed clock periods and sending data serially in response to occurrences of clock edges, the SSP being configured to provide the timing sequence of successive integration intervals by accepting a number of bits forming a word representing an integration interval and delivering an output signal representing the word, the output signal being delivered serially without interruption during a number of the high-speed clock periods equal to the number of bits, thereby eliminating timing jitter by preventing an interruption before completion of any one of the integration intervals.

13. (Original) The measurement system of claim 11, in which the integrating converter is configured to operate with multiple signal value ranges, each of which is associated with multiple integrating storage devices, and has an auto-ranging capability to select automatically a signal value range that can accommodate a present value of an input signal, the integrating converter having successive integration intervals of alternating shorter and longer lengths to decrease an auto-ranging response time of the integrating converter to the signal amplitude when it is rapidly increasing.

14. (Original) The measurement system of claim 11, in which the integrating converter is configured to operate with multiple signal value ranges, each of which is associated with multiple integrating storage devices, and has an auto-ranging capability to select automatically a signal value range that can accommodate a present value of an input

signal, the integrating converter having for each of the signal value ranges a floor value below which the sample output signal produced by the integrating converter cannot drop, irrespective of the signal amplitude, thereby to prevent production of an erroneous sample output signal whenever the signal amplitude decreases rapidly.

15. (Original) The measurement system of claim 14, in which the floor value is different for each of the signal value ranges.

16. (Original) The measurement system of claim 1, further comprising an electronic circuit that processes the signal to provide a temperature measurement.

17. (Original) The measurement system of claim 16, in which:

the electronic circuit further comprises at least one temperature sensor to monitor a temperature of at least one temperature-sensitive component; and

the electronic circuit corrects the temperature measurement based on information obtained from the temperature sensor.

18. (Original) The measurement system of claim 17, in which at least one temperature sensor monitors a field of view of the radiation detector.

19. (Original) The measurement system of claim 17, further comprising a housing and a printed circuit board, and in which the electronic circuit includes the printed circuit board and is confined within the housing by a flexible, thermally conductive potting compound.

20. (Original) The measurement system of claim 16, in which the electronic circuit further includes an analog-to-digital converter (ADC) with an auto-ranging capability that adjusts an integration time of the ADC to maintain an output that is substantially centered between a minimum value and a maximum value.

21. (Original) The measurement system of claim 20, in which the ADC operates with a variable sampling frequency and is associated with a variable depth buffer for averaging a variable number of samples.

22. (Original) The measurement system of claim 1, in which the radiation detector has a field of view (FOV), and the measurement system further comprises a zero offset calibration level that is below the low temperature measurement sensitivity of the measurement system, the zero offset calibration level being determined by: providing a target medium having an emissivity greater than about 0.8; cooling the target medium; configuring the radiation detector so that the cooled target medium occupies the full FOV; and measuring the temperature of the cooled target medium.

23. (Canceled)

24. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing a chemical vapor deposition (CVD) process.

25. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing a physical vapor deposition (PVD) process.

26. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing rapid thermal processing (RTP).

27. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing a plasma assisted chemical vapor deposition process or a plasma assisted etching process.

28. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing a epitaxy process.

29. (Currently amended) The measurement system of claim [[23]] 1, in which the target medium [[is]] includes a semiconductor wafer undergoing a chemical mechanical polishing (CMP) process.

30. (Currently amended) The measurement system of claim [[23]] 5, in which the yttrium aluminum garnet (YAG) is non-doped YAG.